

## REMARKS

Claims 1-33 remain pending. Applicant traverses the Examiner's objections and rejections in light of the amendments above and the remarks that follow.<sup>1</sup>

### Information Disclosure Statements

Applicant acknowledges that the Information Disclosure Statements filed November 26, 2003 and May 10, 2004 have not been considered by the Examiner. (Office Action, p. 2.) Pursuant to 37 C.F.R. 1.98(a)(3)(ii), a supplemental Information Disclosure Statement including the references cited in the first and second Information Disclosure Statements is submitted herewith.

### Rejections Under 35 U.S.C. §103(a)

Applicant traverses the rejection of claim 1 under 35 U.S.C. § 103(a) as allegedly not being patentable over U.S. Patent No. 6,321,197 to *Kushner et al.* ("*Kushner*")<sup>2</sup> in view of U.S. Patent No. 5,828,997 to *Durlach et al.* ("*Durlach*") and U.S. Patent No. 5,867,574 to *Eryilmaz*.

The Examiner concedes that *Kushner* does not teach or suggest "a whitening unit" and "a random parameter extraction unit," as recited in Applicant's claim 1. (Office Action, p. 4:7-8, and p. 5:1-2.) Accordingly, *Kushner* cannot disclose or suggest "a frame state determination unit ... based on the random parameters extracted by the random parameter extraction unit." Furthermore, because *Kushner* fails to disclose or suggest Applicant's claimed "frame state determination unit," the reference also cannot disclose or suggest "a voice region detection unit for detecting a voice region ... based on the voice and noise frames input from the frame state determination unit" (emphasis added), as recited in claim 1.

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<sup>1</sup> The Office Action contains statements characterizing the claims and related art. Regardless of whether any such statements are specifically addressed herein, Applicant's silence as to these characterizations should not be construed as acceptance of them.

<sup>2</sup> Applicant notes that the Office Action misidentifies *Kushner* as U.S. Patent No. 6,862,567.

In sum, *Kushner* fails to disclose Applicant's claimed "whitening unit," "frame state determination unit," "random parameter extraction unit," and "voice region detection unit." *Durlach* and *Eryilmaz* do not overcome *Kushner's* many deficiencies.

*Durlach* discloses a speech recognition system in which time-varying signals  $S_i(t)$ - $S_n(t)$  are received from microphones 20a-20n, respectively. (*Durlach*, cols. 5:53-6:8; FIG. 2.) Time-varying signals  $S_i(t)$ - $S_n(t)$  are transmitted to a direction analyzer 54 and a mixer 56. (*Id.*) Direction analyzer 54 provides an output to noise generator 60 representing the probability that time-varying signals  $S_i(t)$ - $S_n(t)$  originate with a desired target source. (*Id.*) Noise generator 60 generates an amount of noise inversely proportional to the probability signal received from direction analyzer 54. (*Id.*) In mixer 56, time-varying signals  $S_i(t)$ - $S_n(t)$  are mixed with the noise signal, and then input to content analyzer 64, which is a conventional speech recognition subsystem. (*Id.* at cols. 2:37-40, 6:1-8).

The Examiner apparently asserts that *Durlach's* time-varying signals  $S_i(t)$ - $S_n(t)$  correspond to the claimed "input voice signals," and that *Durlach's* noise generator 60 and mixer 56 correspond to the claimed "whitening unit." (Office Action, p:8-13.) Applicant disagrees. First,  $S_i(t)$ - $S_n(t)$  are time-varying signals. *Durlach* does not disclose that signals  $S_i(t)$ - $S_n(t)$  are divided into frames. Accordingly, noise generator 60 and mixer 56 cannot be considered to disclose or suggest "a whitening unit for combining white noise with the frames input from the preprocessing unit" (emphasis added), as recited in Applicant's claim 1.

Second, the Examiner concedes that "white noise is not used when adding to the target signals." However, without providing evidentiary support, the Examiner asserts "it would have been obvious to add white noise to a signal or any other type of notice depending on the environment simulated." (Office Action, p. 4:11-14.) Applicant traverses the Examiner's apparent reliance on Official Notice. Official Notice unsupported by

documentary evidence should only be taken by the Office where the facts asserted to be well-known, or to be common knowledge in the art are capable of instant and unquestionable demonstration as being well-known. (M.P.E.P. § 2144.03.A, emphasis added.) In this case, "add[ing] white noise to a signal or any other type of noise depending on the environment simulated" cannot be instantly or unquestionably demonstrated as being well-known. Thus, the Examiner's reliance on Official Notice without providing evidentiary support is improper. Accordingly, the Examiner has failed to establish that *Durlach* discloses or suggests Applicant's claimed "whitening unit" for this reason as well.

As noted above, the Examiner concedes that *Kushner* fails to disclose the claimed "a whitening unit." (Office Action, p. 4:7-8, and p. 5:1-2.) *Eryilmaz* also fails to disclose this feature of Applicant's claim, and the Examiner does not assert that *Eryilmaz* makes any such disclosure or suggestion. Thus, *Kushner*, *Durlach* and *Eryilmaz*, when taken individually or in any proper combination, fail to disclose or suggest a "whitening unit," as recited in claim 1. Accordingly, the applied references cannot support a rejection of claim 1. Applicant requests that the rejection of claim 1 under Section 103(a) be withdrawn for at least this reason.

Additionally, one of ordinary skill in the art would have no motivation to combine *Kushner* and *Durlach*. *Kushner* is directed to speech recognition in a communication device 100, such as a cellular telephone, a portable telephone handset, a two-way radio, a data interface for a computer or personal organizer. (*Kushner*, col. 3:3-11.) Communication device 100 includes only a single microphone 133. (*Id.*) In contrast, *Durlach* provides a speech recognition system that determines directional information used to include or exclude time-varying signals  $S_i(t)$ - $S_n(t)$  produced by several microphones 50a-50n. (*Durlach*, cols. 5:54-6:16.) There is no reason an artisan would modify *Kushner's* communication device 100, which only includes a single microphone 133, in view of *Durlach's* system, which determines whether to exclude inputs from several microphones 50a-50n. Modifying communication device 100 to include several microphones to detect direction information of

several sources would change the principle operation of the *Kushner*, which is to receive a single audio input. Such a combination is not sufficient to establish a *prima facie* case of obviousness for rejecting claim 1 under 35 U.S.C. § 103(a). (See M.P.E.P. § 2143.01(VI), citing *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959).)

The Examiner asserts that "the motivation to have combined the references involve the ability to incorporate the directionality of a signal for sound localization." (Office Action, p. 4:15-21.) However, for the above-noted reasons, this purported motivation would not suggest modifying a communication device, such as a mobile phone, to include several microphones and determine the direction of a noise source since communication devices only have a single microphone for detecting an individual source.

Since *Kushner* and *Durlach* cannot be properly combined, the Examiner's purported combination of references cannot support a *prima facie* case for rejecting claim 1 under Section 103 for this reason also.

*Eryilmaz* does not cure the deficiencies of *Kushner* and *Durlach*. The Examiner looks to *Eryilmaz* for allegedly disclosing Applicant's claimed "random parameter extraction unit." (Office Action, p. 5.) *Eryilmaz* discloses a system that detects voice activity using voice energy measurement (*Enew* values) for each frame of a sample signal. (*Eryilmaz*, col. 4:55-67.) The voice energy value is derived from the absolute value of a derivative of a speed signal. (*Id.* at col. 2:35-37.) Voice activity can be detected by comparing a ratio between a current voice energy value and a background noise value with a threshold value. (*Id.* at col. 2:38-42.) The Examiner apparently asserts that *Eryilmaz*'s comparison to a threshold value corresponds to Applicant's claimed "extracting random parameters indicating the randomness of frames from the frames input from the whitening unit." Applicant disagrees.

*Eryilmaz's* remote voice activity detector 505 and local voice activity detector 506 output signals to a control means 510 upon detecting voice activity. (*Id.* at col. 10:7-23.) Control means 510 then controls a speakerphone 500 to enter a transmit or a receive mode. (*Id.*) The Examiner apparently argues that *Eryilmaz's* remote voice activity detector 505 and local voice activity detector 506 provide the claimed "random parameters" because the determination of energy is random" and "randomness is addressed by indicating the noise or voice is present in the signal." (Office Action, p. 5.)

To the contrary, voice activity detector 505 and local voice activity detector 506 merely provide an output to control means 510 indicating that a voice is present in a signal. (*Eryilmaz*, col. 10:7-23.) A voice activity indication, even if it occurs randomly, merely indicates the presence of voice activity. However, indicating voice activity cannot be considered to disclose or suggest "indicating the randomness of frames," as recited in claim 1. Accordingly, *Eryilmaz* fails to disclose or suggest "a random parameter extraction unit for extracting random parameters indicating the randomness of frames from the frames input from the whitening unit" (emphasis added), as recited in Applicant's claim 1.

As noted above, the Examiner has conceded that *Kushner* and *Durlach* fail to disclose a "random parameter extraction unit," as recited in claim 1. (Office Action, p. 5:1-2) Because *Eryilmaz* also does not disclose or suggest this feature, *Kushner*, *Durlach* and *Eryilmaz*, taken individually or in combination, cannot support a *prima facie* case for rejecting claim 1 under 35 U.S.C. § 103(a) for this additional reason.

Indeed, nothing in the applied references, when taken as a whole, would disclose or suggest the above-noted features recited in Applicant's claim 1 or the claimed interrelationship of these features. Applicant, therefore, respectfully submits that the only reason the Examiner combined the applied references in the purported manner was based on knowledge gleaned from Applicant's own specification. (*See, e.g.*, Applicant's FIG. 2.)

Such improper hindsight reconstruction cannot support a *prima facie* case for rejecting claim 1 under 35 U.S.C. § 103(a). (See M.P.E.P. § 2142.)

For all the reasons set forth above, the applied references cannot support a rejection of claim 1 under 35 U.S.C. § 103(a). Applicant, therefore, respectfully requests that the rejection of claim 1 be withdrawn and the claim allowed.

Independent claim 18, although of different scope than claim 1, recites features similar to those recited in claim 1. Accordingly, claim 18 is allowable over the applied references for the same reasons set forth above with regard to claim 1.

Claims 2 and 19 depend from independent claims 1 and 18. Accordingly, claims 2 and 19 are allowable over the applied references for at least due to their corresponding dependence from claims 1 and 18.

Applicant traverses the rejections of claims 3-17 and 20-33 under 35 U.S.C. 103(a) based on various combinations of *Kushner*, *Durlach*, and *Eryilmaz* with U.S. Patent No. 6,182,035 to *Mekuria*, U.S. Patent Application No. 2002/0216909 to *Davis et al.*, U.S. Patent No. 5,572,623 to *Pastor*, U.S. Patent No. 7,065,485 to *Chong-White et al.*, "An Adaptive KLT Approach for Speech Enhancement" by *Rezayee et al.* Claims 3-17 and 20-33 depend from independent claims 1 and 18 and, therefore include all the limitations of the corresponding independent claim from which they depend. Applicant respectfully submits that none of these *Mekuria*, *Davis et al.*, *Pastor*, *Chong-White et al.* and *Rezayee et al.* disclose or suggest the above noted features of Applicant's claims missing from *Kushner*, *Durlach*, and *Eryilmaz*, and the Examiner does not assert that these references disclose or suggest such features. Accordingly, claims 3-17 and 20-33 are allowable over the applied references, whether taken alone or in combination, for the reasons already set forth above with regard to claims 1 and 18.

Allowable Subject Matter

Applicant acknowledges with gratitude the Examiner's indication of allowable subject matter in claims 6, 16, 17, 23, 32 and 33.

**Conclusion**

Based on the reasons as set forth above, Applicant respectfully requests allowance of all pending claims. In the event that there are any questions concerning this paper, or the application in general, the Examiner is respectfully urged to telephone Applicant's undersigned representative so that prosecution of the application may be expedited.

It is believed that this response does not require additional fees. However, if additional fees are required for any reason, please charge Deposit Account No. 02-4800 the necessary amount.

Respectfully submitted,

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